



Drinking Water Surveillance Program

**SUDBURY
(DAVID STREET)
WATER TREATMENT
PLANT**

Annual Report 1988



**Environment
Environnement**
Ontario
Ontario

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SUDBURY (DAVID STREET)
WATER TREATMENT PLANT

DRINKING WATER SURVEILLANCE
PROGRAM

ANNUAL REPORT 1988

FEBRUARY 1990



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EXECUTIVE SUMMARY

DRINKING WATER SURVEILLANCE PROGRAM

SUDBURY (DAVID STREET) WATER TREATMENT PLANT 1988 ANNUAL REPORT

The Drinking Water Surveillance Program (DWSP) for Ontario is a monitoring program providing immediate, reliable, current information on drinking water quality. The DWSP officially began in April 1986 and is designed to eventually include all municipal supplies in Ontario. Currently, 52 plants are being monitored.

The Sudbury (David Street) Water Treatment Plant has a pumping station for the water from Ramsey Lake. The water is disinfected, fluoridated and adjusted for pH. The plant has a design capacity of 50 x 1000 m³/day. This supply together with the Wanapitei Water Supply System serves a population of 95,000.

Samples of two distribution system sites were taken seven times in 1988 and analyzed for approximately 160 parameters. Parameters were divided into the following groups Bacteriological, Inorganic and Physical (Laboratory Chemistry, Field Chemistry and Metals) and Organics (Chloroaromatics, Pesticides and PCB and Volatiles).

A summary of results is shown in Table 1.

Inorganic and Physical parameters (Laboratory Chemistry, Field Chemistry and Metals) were below any applicable health related ODWOs.

Of approximately 110 Organic parameters tested for on a monthly basis, none exceeded health related guidelines.

Effective treatment should be provided to ensure safety and consistency in the quality of all waters. The current Ministry policy (#15-14-01) requires that all surface waters shall use treatment processes consisting of coagulation-flocculation, filtration (or equivalent) and disinfection. Surface supplies without such treatment are subject to contamination with biological organisms, including algae, protozoa and other organisms that can cause taste and odour and other aesthetic problems in the distributed water.

While the parameters measured on DWSP may not have exceeded drinking water guidelines, the water produced cannot be considered to be satisfactory until a treatment process appropriate to the source of the supply is applied (see ODWOs revised 1983 p7).

TABLE 1

DRINKING WATER SURVEILLANCE PROGRAM SUDBURY (DAVID ST WTP)

SUMMARY TABLE BY SCAM

SCAM	SITE 1		SITE 2	
	TESTS	POSITIVE	TESTS	POSITIVE
BACTERIOLOGICAL	16	3	18	3
CHEMISTRY (FLD)	48	48	100	55
CHEMISTRY (LAB)	204	166	81	237
METALS	282	131	46	329
CHLOROHYDRATES	84	0	0	98
PESTICIDES & PCB	194	0	0	228
SPECIFIC PESTICIDES	0	0	0	0
VOLATILES	110	9	8	138
TOTAL	938	357	1101	426

NO HEALTH RELATED GUIDELINES WERE EXCEEDED

A POSITIVE VALUE DEMOTES THAT THE RESULT IS GREATER THAN THE STATISTICAL LIMIT OF DETECTION AND IS QUANTIFIABLE
 A '0' INDICATES THAT NO SAMPLE WAS TAKEN

DRINKING WATER SURVEILLANCE PROGRAM

SUDBURY (DAVID STREET) WATER TREATMENT PLANT 1988 ANNUAL REPORT

INTRODUCTION

The Drinking Water Surveillance Program (DWSP) for Ontario is a monitoring program providing immediate, reliable, current information on drinking water quality. The DWSP officially began in April 1986 and is designed to eventually include all municipal supplies in Ontario. Currently, 52 plants are being monitored.

The DWSP was initiated at the Sudbury (David Street) Water Supply in April of 1987. An Annual Report was published for 1987 (ISSN 0840-5336).

PLANT DESCRIPTION

The Sudbury (David Street) Water Treatment Plant consists of a pumping station where chlorine (for disinfection) and fluoride are added to water from Ramsey Lake. Calcium Hydroxide is used for pH adjustment. The plant has a design capacity of $50 \times 1000 \text{ m}^3/\text{day}$ and flows on day of sampling ranging from $17.9 \times 1000 \text{ m}^3/\text{day}$ to $34.5 \times 1000 \text{ m}^3/\text{day}$. This supply together with the Wanapitei Water Supply serves a population of approximately 95,000.

Plans are currently underway to increase the capacity of the water supply system for Sudbury.

The plant location is shown in Figure 1. General plant information is presented in Table 2.

METHODS

No samples of the raw and treated water at the pumping station were obtained because sampling lines meeting DWSP requirements were not installed. Water samples were obtained from two DWSP approved locations;

- i) Distribution System - Site 1 - This house is approximately 2.5 kilometers from the plant. Water was sampled through a copper sample line at the basement laundry tap.
- ii) Distribution System - Site 2 - This house is approximately 6.7 kilometers from the plant. Water was sampled through a copper sample line at the basement laundry tap.

At the distribution system sites two types of samples were obtained: a standing and a free flow. The standing sample consisted of water that had been in the household plumbing and service connection for a minimum of six hours. These samples are

used to make an assessment of the amount by which the levels of inorganic compounds and metals may be changed on standing due to leaching from (or deposition on) the plumbing system. The only analyses carried out on the standing samples therefore, are General Chemistry and Metals. The free flow sample represented fresh water from the distribution main that had been flowing at the sample tap for five minutes before the sample was taken.

Stringent DWSP sampling protocols were followed to ensure that all samples were taken in a uniform manner.

Sample day flow, treatment chemical dosages and Field Chemistry measurements such as Turbidity, Chlorine Residuals, pH and Temperature were recorded on the day of sampling and were entered on the DWSP data base.

RESULTS

The Sudbury (David Street) distribution system was sampled for approximately 160 parameters on a monthly basis. At the request of the municipality all sampling was discontinued in August. As a result of an unforeseen emergency the laboratory capacity was exceeded and analysis for volatiles could not be carried out when the samples were received. Since analysis for volatiles is no longer valid after four weeks of storage, volatile results for January or February are not available.

FIGURE 1

DRINKING WATER SURVEILLANCE PROGRAM

SITE LOCATION MAP

SUDBURY WATER SUPPLY SYSTEM



TABLE 2

DRINKING WATER SURVEILLANCE PROGRAM ANNUAL REPORT

GENERAL INFORMATION

SUDBURY (DAVID STREET) WATER TREATMENT PLANT

LOCATION: DAVID STREET
SUDBURY, ONTARIO

SOURCE: RAW WATER SOURCE - RAMSEY LAKE

DESIGN CAPACITY: 50.0 (1000 M³/DAY)

OPERATION: MUNICIPALITY

PLANT SUPERINTENDENT: J. KREIG

MINISTRY REGION: NORTHEAST

DISTRICT OFFICER: J.G. ROBERTSON

<u>MUNICIPALITY SERVED</u>	<u>POPULATION</u>
SUDBURY	90,453

Table 3 contains information on the sample day retention time, flow rate and treatment chemicals used and their associated dosages.

Table 4 is a summary break-down of the number of water samples analysed by parameter and by water type. The number of times a positive or trace result was detected is also reported.

Positive denotes that the result is greater than the statistical limit of detection established by the Ministry of the Environment (MOE) laboratory staff and is quantifiable. Trace (<T) denotes that the level measured is greater than the lowest value detectable by the method but lies so close to the detection limit that it cannot be confidently quantified.

Table 5 presents the results for parameters detected on at least one occasion.

Table 6 lists all parameters analysed in the DWSP.

Associated guidelines and detection limits are also supplied on both tables. Parameters are listed alphabetically within each scan.

DISCUSSION

General

Water quality is judged by comparison with the Ontario Drinking Water Objectives (ODWOs) as defined in the 1984 publication (ISBN 0-7743-8985-0). The Province of Ontario has health related and aesthetic objectives for 49 parameters, these are currently under review. When an ODWO is not available guidelines/limits from other agencies are consulted. The Parameters Listing System (PALIS) recently published (ISSN 0-7729-4461-X) by the MOE catalogues and keeps current over 1750 guidelines for 650 parameters from agencies throughout the world.

Although some of the parameters measured on DWSP may be present in the raw and treated water as a result of pollution, many of the compounds detected are naturally occurring or are treatment by-products.

Plant operational personnel address occurrences of taste and odour or biological water quality parameters. The DWSP does not assess these aspects of the water supply.

As stated under Results, traces do not indicate quantifiable values, as defined by established MOE Laboratory analytical reporting protocols. While they can be useful in trend analysis or confirmation of the presence of a specific contaminant that is

repeatedly detected at these levels, the occasional finding of a trace level of a contaminant is not considered to be significant.

DISCUSSION OF GUIDELINES AND LIMITS THEREFORE, IS ONLY CONDUCTED ON POSITIVE RESULTS.

Bacteriology

Positive results for the Bacteriology scan were present three times in the Site 1 WATER and three times in the Site 2 water. The positive parameters were all for Standard Plate Count.

Standard Plate Count is a test used to supplement routine analysis for Coliform bacteria. The limit for Standard Plate Count (at 35°C after 48 hours) in the ODWOs is 500 organisms per mL (based on a geometric mean of 5 or more samples).

Guidelines for bacteriological sampling and testing of a supply are developed to maintain a proper supervision of its bacteriological quality; the routine monitoring program usually requires the taking of multiple samples in a given system. Full interpretation of bacteriological quality cannot be made on the basis of single samples. Further, bacteriological limits were developed in acknowledgement that the presence of coliforms may be detected due to their non-uniform distribution throughout the distribution system and the fact that their enumeration is subject to considerable variation. Routine bacteriological monitoring, as

outlined in the ODWOs is carried out by the operating authority.

Inorganic and Physical Parameters

Laboratory and Field Chemistry

The results for Laboratory Chemistry and Field Chemistry scans were below applicable health related ODWOs.

The source water is soft and of low alkalinity and therefore potentially corrosive; currently there are no data available (in the absence of raw and treated samples) to assess the affects of corrosivity as the water goes from the pumping station through the distribution system to the houses.

The Langelier Index is used extensively in estimating the corrosion potential of water. An increasingly negative index indicates the increasing possibility of corrosion. It is considered sound engineering practice to maintain a slightly positive Langelier Index. The Langelier Index for the Sudbury (David Street) is consistently negative.

Turbidity in water is caused by the presence of suspended matter such as clay, silt, colloidal particles, plankton and other microscopic organisms. The most important potential health effect of Turbidity is its interference with disinfection in the treatment plant and maintenance of a chlorine residual. The ODWO of 1

Formazin Turbidity Unit (FTU) is only applicable to water leaving the plant.

Colour values exceeded the aesthetic ODWO of 5 True Colour Units (TCU) in two of the Site 1 free flow samples and seven of the Site 2 samples. Colour in drinking water may be due to the presence of natural or synthetic organic substances as well as certain metallic ions.

As part of the treatment process Sodium Silicofluoride is added to the treated water (Table 3). Where fluoridation is practised, the Fluoride concentration recommended in the ODWO is 1.2 mg/L, plus or minus 0.2 mg/L. This level was maintained in most of the distribution system samples, the Fluoride levels were lower than recommended in the February Site 2 water.

Metals

The results reported for the Metal scan were below any applicable health related ODWOs.

Copper, Lead and Zinc levels were generally elevated in the standing samples as compared to the free flow samples indicating that these metals were leached from the household plumbing as the water stood overnight. This together with a negative Langelier Index indicates that the pH correction may not be sufficient to completely control the corrosive tendency of the water.

The aesthetic ODWO of 50 ug/L for Manganese was exceeded twice in the February and March free flow samples at Site 1 with levels of 54 ug/L and 72 ug/L, and three times in the February, March and April samples from Site 2 with levels of 61 ug/L, 90 ug/L and 64 ug/L. When levels are above the ODWO a bitter taste may be imparted to the water.

The European Economic Community's Maximum Admissible Concentration for Nickel in drinking water of .05 mg/L was exceeded in all of the distribution system samples. In Ontario a guideline value for Nickel is not being considered necessary based on the toxicological data available.

Organic

Chloroaromatics

The results of the Chloroaromatics group showed that no chloroaromatics were detected.

Pesticides and PCB (Polychlorinated Biphenyl)

The results of the Pesticides and PCB scan showed that no PCBs were detected and that two pesticides were detected:

Alpha BHC

Lindane

There are several isomers of BHC (Benzene Hexachloride); gamma BHC is the active ingredient of the pesticide Lindane, while alpha BHC is the isomer most predominantly found in surface waters of the Great Lakes basin as indicated in results from other water supplies on DWSP.

Alpha BHC was detected at trace levels, three times in the Site 1 water, and three times in the Site 2 water.

Lindane was detected at trace levels, once in both distribution system waters.

The origin of these pesticides is most likely the source water.

Volatiles

Within the Volatile scan two parameters, other than Trihalomethanes (THMs), were detected:

Toluene

Ethylbenzene

Toluene was detected at trace levels, once in the Site 1 water and three times in the Site 2 water. The detection of toluene at low, trace levels is a laboratory artifact derived from the analytical methodology. The purge-and-trap analytical technique depends on the purging of the volatile organics in the water sample with helium gas onto a Tenax trapping column. The volatile materials are

subsequently thermally desorbed, separated and quantified. Tenax, a toluene-like polymeric material, tends to decompose sporadically upon heating into toluene and other aromatic componenets (ethylbenzene and xylene) giving instrument blanks in the order of 0.05 ug/L.

Ethylbenzene was detected at trace levels, twice in the Site 1 water and twice in the Site 2 water.

These volatiles are typically found on an occasional basis at other water supplies included on the DWSP, usually at trace levels.

THMs are acknowledged to be produced during the water treatment process and will always occur in chlorinated surface waters. THMs are comprised of Chloroform, Chlorodibromomethane and Dichlorobromomethane with Bromoform occurring occasionally. Results are reported for the individual compounds as well as for total THMs.

Chloroform, Chlorodibromomethane, Dichlorobromomethane and Total THMs were detected in all waters. Bromoform was not detected. All Total THM occurrences, ranging from 39.95 ug/L to 48.1 ug/L, were well below the ODWO of 350 ug/L.

CONCLUSIONS

Effective treatment should be provided to ensure safety and consistency in the quality of all waters. The current Ministry policy (#15-14-01) requires that all surface waters shall use treatment processes consisting of coagulation-flocculation, filtration (or equivalent) and disinfection. Surface supplies without such treatment are subject to contamination with biological organisms, including algae, protozoa and other organisms that can cause taste and odour and other aesthetic problems in the distributed water.

While the parameters measured on DWSP may not have exceeded drinking water guidelines, the water produced cannot be considered to be satisfactory until a treatment process appropriate to the source of the supply is applied (see ODWOs revised 1983 p7).

RECOMMENDATIONS

Two recommendations can be made:

- 1) To fully assess water quality at this supply
 - a) the plant should retrofit their sampling lines to meet with the DWSP requirements so that the plant raw and treated water can be evaluated
 - b) sampling in the distribution system should be continued.

2) Considering the corrosivity of the water and the high levels of metal in the standing water samples, the pH adjustment should be reviewed to ensure a slightly positive Langelier Index.

TABLE 3

DRINKING WATER SURVEILLANCE PROGRAM SUDBURY (DAVID ST WTP) SAMPLE DAY CONDITIONS FOR 1988

SAMPLE DAY CONDITIONS		TREATMENT CHEMICAL DOSAGES (MG/L)			
DATE	RETENTION TIME (HRS)	FLOW (1000 M3)	PRE-CHLORINATION	FLUORIDATION	POST PH ADJUSTMENT
			CHLORINE	SODIUM SILICOFLOURIDE	CALCIUM HYDROXIDE
JAN 26	.	20.2	01.45	.	12.60
FEB 23	.	26.5	02.65	00.63	13.60
MAR 29	.	18.9	02.40	00.57	15.60
APR 26	.	21.2	01.70	00.57	15.10
MAY 24	.	17.9	04.30	00.54	12.60
JUN 28	.	23.8	01.14	00.54	18.22
JUL 19	.	34.5	02.02	00.36	11.10

TABLE 4

DRINKING WATER SURVEILLANCE PROGRAM SUBBURY (DAVID ST WTP)

SUMMARY TABLE OF RESULTS (1988)

SCAN	PARAMETER	SITE 1		SITE 2	
		TOTAL	POSITIVE TRACE	TOTAL	POSITIVE TRACE
BACTERIOLOGICAL	STANDARD PLATE CNT MF	3	3	0	3
	P/A BOTTLE	5	0	0	5
	TOTAL COLIFORM MF	4	0	0	4
	T COLIFORM BCKGRD MF	4	0	0	4

*TOTAL SCAN BACTERIOLOGICAL		16	3	0	16
*TOTAL GROUP BACTERIOLOGICAL		16	3	0	16

CHEMISTRY (FLD)	FLD CHLORINE (COMB)	9	9	0	9
	FLD CHLORINE FREE	10	10	0	14
	FLD CHLORINE (TOTAL)	10	10	0	14
	FLD PH	10	10	0	14
	FLD TEMPERATURE	9	9	0	13

*TOTAL SCAN CHEMISTRY (FLD)		48	48	0	55

CHEMISTRY (LAB)	ALKALINITY	12	12	0	14
	CALCIUM	12	12	0	14
	CYANIDE	6	0	0	7
	CHLORIDE	12	12	0	14
	COLOUR	12	11	1	14
	CONDUCTIVITY	12	12	0	14

	FLUORIDE	12	12	0	14

TABLE 4

DRINKING WATER SURVEILLANCE PROGRAM SUBBURY (DAVID ST WTP)

SUMMARY TABLE OF RESULTS (1988)

SCAN	PARAMETER	SITE 1		SITE 2	
		TOTAL	POSITIVE TRACE	TOTAL	POSITIVE TRACE
CHEMISTRY (LAB)	HARDNESS	12	12	0	14
	IONICAL	12	2	0	14
	LANGELIER'S INDEX	4	4	0	4
	MAGNESIUM	12	12	0	14
	SODIUM	12	12	0	14
	AMMONIUM TOTAL	12	8	4	14
	NITRITE	12	0	12	14
	TOTAL NITRATES	12	7	3	14
	NITROGEN TOT KJELD	12	12	0	14
	PH	12	12	0	14
	SULPHATE	2	2	0	2
	TURBIDITY	12	12	0	14
	*TOTAL SCAM CHEMISTRY (LAB)	204	166	20	237
				196	20

METALS	SILVER	12	0	10	14	0	8
	ALUMINIUM	12	12	0	14	14	0
	ARSENIC	12	4	5	14	5	5
	BARIUM	12	12	0	14	14	0
	BORON	12	0	12	14	0	14
	BERYLLIUM	12	0	8	14	0	9
	CADMIUM	12	1	11	14	1	13
	COBALT	12	5	7	14	7	7
	CHROMIUM	12	0	10	14	0	12

TABLE 4

DRINKING WATER SURVEILLANCE PROGRAM SUBBURY (DAVID ST WTP)

SUMMARY TABLE OF RESULTS (1988)

SCAN	PARAMETER	SITE 1		SITE 2			
		TOTAL	POSITIVE TRACE	TOTAL	POSITIVE TRACE		
METALS	COPPER	12	12	0	14	14	0
	IRON	12	10	2	14	14	0
	MERCURY	6	2	1	7	3	2
	MANGANESE	12	12	0	14	14	0
	MOLYBDENUM	12	0	12	14	0	14
	NICKEL	12	12	0	14	14	0
	LEAD	12	12	0	14	14	0
	ANTIMONY	12	1	11	14	2	12
	SELENIUM	12	0	11	14	0	13
	STRONTIUM	12	12	0	14	14	0
	TITANIUM	12	12	0	14	14	0
	THALLIUM	12	0	7	14	0	6
	URANIUM	12	0	12	14	0	14
	VANADIUM	12	0	9	14	0	9
	ZINC	12	12	0	14	14	0
*TOTAL SCAN METALS		282	131	128	329	158	138
*TOTAL GROUP INORGANIC & PHYSICAL		534	345	148	621	409	158
CHLOROBROMATICS	HEXACHLOROBUTADIENE	6	0	0	7	0	0
	123 TRICHLOROBENZENE	6	0	0	7	0	0
	1234 1-CHLOROBENZENE	6	0	0	7	0	0
	1235 1-CHLOROBENZENE	6	0	0	7	0	0
	124 TRICHLOROBENZENE	6	0	0	7	0	0

TABLE 4

DRINKING WATER SURVEILLANCE PROGRAM SUBBURY (DAVID ST MTP)

SUMMARY TABLE OF RESULTS (1988)

SCAN	PARAMETER	SITE 1		SITE 2	
		TOTAL	POSITIVE TRACE	TOTAL	POSITIVE TRACE
CHLOROAROMATICS					
	1245 T-CHLOROBENZENE	6	0	7	0
	135 TRICHLOROBENZENE	6	0	7	0
	HCB	6	0	7	0
	HEXACHLOROETHANE	6	0	7	0
	OCTACHLOROSTYRENE	6	0	7	0
	PENTACHLOROBENZENE	6	0	7	0
	236 TRICHLOROTOLUENE	6	0	7	0
	245 TRICHLOROTOLUENE	6	0	7	0
	26A TRICHLOROTOLUENE	6	0	7	0
*TOTAL SCAN CHLOROAROMATICS		84	0	98	0
PESTICIDES & PCB					
	ALDRIN	6	0	7	0
	ALPHA BHC	6	0	7	0
	BETA BHC	6	0	7	0
	LINDANE	6	0	7	0
	ALPHA CHLORDANE	6	0	7	0
	GAMMA CHLORDANE	6	0	7	0
	DIELDRIN	6	0	7	0
	METHOXYCHLOR	6	0	7	0
	ENDOSULFAN I	6	0	7	0
	ENDOSULFAN II	6	0	7	0
	ENDRIN	6	0	7	0
	ENDOSULFAN SULPHATE	6	0	7	0

TABLE 4

DRINKING WATER SURVEILLANCE PROGRAM SUDBURY (DAVID ST WTP)

SUMMARY TABLE OF RESULTS (1988)

SCAN	PARAMETER	SITE 1		SITE 2	
		TOTAL	POSITIVE TRACE	TOTAL	POSITIVE TRACE
PESTICIDES & PCB	HEPTACHLOR EPOXIDE	6	0	7	0
	HEPTACHLOR	6	0	7	0
	MIREX	6	0	7	0
	OXYCHLORDANE	6	0	7	0
	OPDOT	6	0	7	0
	PCB	6	0	7	0
	DDD	6	0	7	0
	PPODE	6	0	7	0
	PPDOT	6	0	7	0
	AMETRINE	6	0	7	0
	ATRAZINE	6	0	7	0
	ATRAZONE	6	0	7	0
	CYAMAZINE	6	0	7	0
	DES ETHYL ATRAZINE	1	0	2	0
	DES ETHYL SINAZINE	1	0	2	0
	PROMETONE	6	0	7	0
	PROPACINE	6	0	7	0
	PROMETRYNE	6	0	7	0
	METRIBUZIN	6	0	7	0
	SINAZINE	6	0	7	0
	ALACHLOR	6	0	7	0
	METOLACHLOR	6	0	7	0
*TOTAL SCAN PESTICIDES & PCB		194	0	228	0
			4		4

TABLE 4

DRINKING WATER SURVEILLANCE PROGRAM SUBBURY (DAVID ST WTP)

SUMMARY TABLE OF RESULTS (1988)

SCAN	PARAMETER	SITE 1		SITE 2	
		TOTAL POSITIVE	TRACE	TOTAL POSITIVE	TRACE
SPECIFIC PESTICIDES	TOXAPHENE	0	0	0	0
*TOTAL SCAN	SPECIFIC PESTICIDES	0	0	0	0
VOLATILES					
	BENZENE	4	0	5	0
	TOLUENE	4	0	5	1
	ETHYLBENZENE	3	0	4	0
	P-XYLENE	4	0	5	0
	M-XYLENE	4	0	5	0
	O-XYLENE	4	0	5	0
	1,1 DICHLOROETHYLENE	4	0	5	0
	METHYLENE CHLORIDE	4	0	5	0
	1,1,2 DICHLOROETHYLENE	4	0	5	0
	1,1 DICHLOROETHANE	4	0	5	0
	CHLOROFORM	3	3	4	4
	111, TRICHLOROETHANE	4	0	5	0
	1,2 DICHLOROETHANE	4	0	5	0
	CARBON TETRACHLORIDE	4	0	5	0
	1,2 DICHLOROPROPANE	4	0	5	0
	TRICHLOROETHYLENE	4	0	5	0
	DICHLOROBROMOMETHANE	3	3	4	4
	112 TRICHLOROETHANE	4	0	5	0
	CHLORODIBROMOMETHANE	3	0	3	1
	T-CHLOROETHYLENE	4	0	5	0

TABLE 4

DRINKING WATER SURVEILLANCE PROGRAM SUBURBY (DAVID ST WTP)

SUMMARY TABLE OF RESULTS (1968)

SCAM	PARAMETER	SITE 1		SITE 2	
		TOTAL	POSITIVE TRACE	TOTAL	POSITIVE TRACE
VOLATILES	BROMOFORM	4	0	0	0
	1122 T-CHLOROETHANE	4	0	0	0
	CHLOROBENZENE	4	0	0	0
	1,4 DICHLOROBENZENE	4	0	0	0
	1,3 DICHLOROBENZENE	4	0	0	0
	1,2 DICHLOROBENZENE	4	0	0	0
	TRIFLUOROCHLOROTOLUENE	3	0	0	0
	ETHYLENE DIBROMIDE	4	0	0	0
	TOTL TRITHALOMETHANES	3	3	0	4
*TOTAL SCAM VOLATILES		110	9	6	138
*TOTAL GROUP ORGANIC		388	9	10	464
TOTAL		938	357	158	1101
					426
					169

KEY TO TABLE 5 and 6

- A **ONTARIO DRINKING WATER OBJECTIVES (ODWO)**
1. Maximum Acceptable Concentration (MAC)
1+. MAC for Total Trihalomethanes
1*. MAC for Bacteriological Analyses
 Poor water quality is indicated when :
 - total coliform counts $> 0 < 5$
 - P/A Bottle Test is present after 48 hours
 - Aeromonas organisms are detected in more than 25% of samples in a single submission or in successive submissions from the same sampling site
 - Pseudomonas Aeruginosa, Staphylococcus Aureus and members of the Fecal Streptococcus group should not be detected in any sample
 - Standard Plate Count should not exceed 500 organisms per ml at 35 °C within 48 hours
2. Interim Maximum Acceptable Concentration (IMAC)
3. Maximum Desirable Concentration (MDC)
4. Aesthetic or Recommended Operational Guideline
 - hardness levels between 80 and 100 mg/L as calcium carbonate are considered to provide an acceptable balance between corrosion and incrustation, water supplies with a hardness > 200 mg/L are considered poor and those in excess of 500 mg/L are unacceptable.
- B **HEALTH & WELFARE CANADA (H&W)**
1. Maximum Acceptable Concentration (MAC)
2. Proposed MAC
3. Interim MAC
4. Aesthetic Objective (AO) (for xylenes, the AO is a total)
- C **WORLD HEALTH ORGANIZATION (WHO)**
1. Guideline Value (GV)
2. Tentative GV
3. Aesthetic GV
- D **US ENVIRONMENTAL PROTECTION AGENCY (EPA)**
1. Maximum Contaminant Level (MCL)
2. Suggested No-Adverse Effect Level (SNAEL)
3. Lifetime Health Advisory
4. EPA Ambient Water Quality Criteria
- F **EUROPEAN ECONOMIC COMMUNITY (EEC)**
1. Health Related Guideline Level
2. Aesthetic Guideline Level
3. Maximum Admissible Concentration (MADC)
- G **CALIFORNIA STATE DEPARTMENT OF HEALTH-GUIDELINE VALUE**
- H **USSR MAXIMUM PERMISSIBLE CONCENTRATION**
- I **NEW YORK STATE AMBIENT WATER GUIDELINE**
- N/A **NONE AVAILABLE**

LABORATORY RESULTS. REMARK DESCRIPTIONS

.	No Sample Taken
BDL	Below Minimum Measurable Amount
<T	Greater Than Detection Limit But Not Confident
>	Results Are Greater Than The Upper Limit
<=>	Approximate Result
!AW	No Data: Analysis Withdrawn
!CR	No Data: Could Not Confirm By Reanalysis
!CS	No Data: Contamination Suspected
!IL	No Data: Sample Incorrectly Labelled
!IS	No Data: Insufficient Sample
!LA	No Data: Laboratory Accident
!LD	No Data: Test Queued After Sample Discarded
!NA	No Data: No Authorization To Perform Reanalysis
!NP	No Data: No Procedure
!NR	No Data: Sample Not Received
!OP	No Data: Obscured Plate
!PE	No Data: Procedural Error - Sample Discarded
!PH	No Data: Sample pH Outside Valid Range
!RO	No Data: See Attached Report (no numeric results)
!SM	No Data: Sample Missing
!SS	No Data: Send Separate Sample Properly Preserved
!UI	No Data: Indeterminant Interference
!TX	No Data: Time Expired
A3C	Approximate, Total Count Exceeded 300 Colonies
APL	Additional Peak, Large, Not Priority Pollutant
APS	Additional Peak, Less Than, Not Priority Pollutant
CIC	Possible Contamination, Improper Cap
CRO	Calculated Result Only
PPS	Test Performed On Preserved Sample

RMP P and M-Xylene Not Separated
RRV Rerun Verification
RVU Reported Value Unusual
SPS Several Peaks, Small, Not Priority Pollutant
UAL Unreliable: Sample Age Exceeds Normal Limit
UCR Unreliable: Could Not Confirm By Reanalysis
UCS Unreliable: Contamination Suspected
UIN Unreliable: Indeterminant Interference
XP Positive After X Number of Hours

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM SUBURBY (DAVID ST WTP) 1988

WATER TREATMENT PLANT

DISTRIBUTION SYSTEM

SITE 1		SITE 2		
STANDING	FREE FLOW	STANDING	FREE FLOW	
BACTERIOLOGICAL				
STANDRD PLATE CNT MF ()		DET'M LIMIT = 0		GUIDELINE = 500/ML (A1)
FEB	10	.	78	
MAR	1AM	.	1AM	
APR	8	.	6	
MAY	6	.	21	
JUL	1LA	.	1LA	
P/A BOTTLE ()		DET'M LIMIT = 0		GUIDELINE = 0 (A1*)
FEB	0	.	0	
MAR	0	.	0	
APR	0	.	0	
MAY	0	.	0	
JUL	0	.	0	
TOTAL COLIFORM MF ()		DET'M LIMIT = 0		GUIDELINE = 5/100ML(A1)
FEB	0	.	0	
MAR	0	.	0	
APR	0	.	0	
MAY	0	.	0	
JUL	1LA	.	1LA	
T COLIFORM BCKGRD MF ()		DET'M LIMIT = 0		GUIDELINE = N/A
FEB	0	.	0	
MAR	0	.	0	
APR	0	.	0	
MAY	0	.	0	
JUL	1LA	.	1LA	

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM SUDBURY (DAVID ST WTP) 1988

WATER TREATMENT PLANT

DISTRIBUTION SYSTEM

SITE 1		SITE 2	
STANDING	FREE FLOW	STANDING	FREE FLOW
CHEMISTRY (FLD)			
FLD CHLORINE (COMB) (MG/L)		DET'N LIMIT = N/A	
		GUIDELINE = N/A	
JAN	.100	.100	.
FEB	.200	.100	.
MAR	.	.200	.
MAY	.100	.100	.
JUL	.300	.100	.
FLD CHLORINE FREE (MG/L)		DET'N LIMIT = N/A	
		GUIDELINE = N/A	
JAN	.300	.200	.100
FEB	.400	.300	.100
MAR	1.000	.400	.100
APR	.	.	.100
MAY	.300	.200	.100
JUN	.	.	.100
JUL	.400	.200	.100
FLD CHLORINE (TOTAL) (MG/L)		DET'N LIMIT = N/A	
		GUIDELINE = N/A	
JAN	.400	.300	.100
FEB	.600	.400	.100
MAR	1.000	.600	.100
APR	.	.	.100
MAY	.400	.300	.100
JUN	.	.	.100
JUL	.700	.300	.100
FLD PH (DNWSLESS)		DET'N LIMIT = N/A	
		GUIDELINE = 6.5-8.5(A4)	
JAN	7.300	7.900	7.400
FEB	7.500	7.600	7.400
MAR	7.300	7.500	7.400
APR	.	.	7.400
MAY	7.100	7.300	7.600
JUN	.	.	7.400
JUL	7.000	6.900	7.400
FLD TEMPERATURE ()		DET'N LIMIT = N/A	
		GUIDELINE = 15 (A1)	
JAN	.	3.300	17.000
FEB	6.700	3.600	.
MAR	5.600	2.800	14.000
APR	.	.	12.500
MAY	16.700	8.900	17.000
JUN	.	.	16.000
JUL	17.800	12.200	21.000

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM SUDBURY (DAVID ST WTP) 1988

WATER TREATMENT PLANT

DISTRIBUTION SYSTEM

SITE 1		SITE 2		
STANDING	FREE FLOW	STANDING	FREE FLOW	

CHEMISTRY (LAB)				
ALKALINITY (MG/L)		DET'M LIMIT = .200		GUIDELINE = 30-500 (A4)
JAN	33.900	33.300	36.100	32.800
FEB	34.400	34.900	35.300	31.200
MAR	35.500	35.400	37.000	34.700
APR	26.900	26.900	37.000	30.400
MAY	26.200	25.300	31.200	29.300
JUN	"	"	33.300	32.900
JUL	29.800	24.000	28.000	24.200

CALCIUM (MG/L)		DET'M LIMIT = .100		GUIDELINE = 100 (F2)
JAN	21.600	21.800	20.600	20.200
FEB	21.000	21.200	20.200	19.000
MAR	22.200	22.600	21.600	21.000
APR	17.600	17.200	20.200	17.800
MAY	17.200	16.800	18.800	17.800
JUN	"	"	20.200	19.800
JUL	18.200	17.400	17.600	16.600

CHLORIDE (MG/L)		DET'M LIMIT = .200		GUIDELINE = 250 (A3)
JAN	61.200	61.700	62.300	62.600
FEB	69.400	69.700	70.000	70.300
MAR	68.900	68.800	69.400	67.500
APR	57.800	59.900	74.000	71.800
MAY	51.700	52.400	57.600	57.900
JUN	"	"	57.200	57.400
JUL	56.300	54.600	55.200	56.700

COLOUR (NZU)		DET'M LIMIT = .5		GUIDELINE = 5.0 (A3)
JAN	6.000	4.500	4.500	5.500
FEB	19.500	8.000	8.000	7.500
MAR	12.500	6.000	7.500	7.500
APR	6.000	4.500	7.000	8.000
MAY	4.000	4.000	5.500	6.000
JUN	"	"	6.000	6.000
JUL	1.500 <T	4.500	7.000	7.500

CONDUCTIVITY (UMHO/CM)		DET'M LIMIT = 1		GUIDELINE = 400 (F2)
JAN	346	342	346	345
FEB	372	379	372	369
MAR	376	376	382	371
APR	333	336	398	381
MAY	299	300	330	326
JUN	"	"	304	322
JUL	306	313	317	312

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM SLIDBURY (DAVID ST WTP) 1988

WATER TREATMENT PLANT

DISTRIBUTION SYSTEM

SITE 1		SITE 2		
STANDING	FREE FLOW	STANDING	FREE FLOW	
FLUORIDE (MG/L)		DET'M LIMIT = .01		GUIDELINE = 2.400 (A1)
JAN	1.120	1.080	1.060	1.060
FEB	1.150	1.200	.890	.870
MAR	1.020	.990	.960	.950
APR	.940	.970	1.020	.970
MAY	.980	.990	1.000	.970
JUN	.	.	1.060	1.100
JUL	.950	1.020	.970	1.010
HARDNESS (MG/L)		DET'M LIMIT = .500		GUIDELINE = 80-100 (A4)
JAN	75.000	75.000	71.000	71.000
FEB	72.000	74.000	71.000	68.000
MAR	80.000	81.000	78.000	77.000
APR	64.000	63.000	75.000	68.000
MAY	61.000	59.000	66.000	65.000
JUN	.	.	71.000	69.000
JUL	66.000	64.000	65.000	62.000
IONCAL (DMMSLESS)		DET'M LIMIT = N/A		GUIDELINE = N/A
JAN	.000 NAF	.000 NAF	.000 NAF	.000 NAF
FEB	.000 NAF	.000 NAF	.000 NAF	.000 NAF
MAR	.000 NAF	.000 NAF	.000 NAF	.000 NAF
APR	.000 NAF	.000 NAF	.000 NAF	.000 NAF
MAY	.000 NAF	.000 NAF	.000 NAF	.000 NAF
JUN	.	.	.000 NAF	.000 NAF
JUL	6.311	4.536	1.800	.359
LANGLIERS INDEX (DMMSLESS)		DET'M LIMIT = N/A		GUIDELINE = N/A
JAN	-.831 NAF	-.794 NAF	-1.054 NAF	-.914 NAF
FEB	-.939 NAF	-.890 NAF	-.995 NAF	-1.185 NAF
MAR	-.882 NAF	-.836 NAF	-.837 NAF	-.936 NAF
APR	1.109 NAF	1.120 NAF	.807 NAF	1.006 NAF
MAY	1.125 NAF	1.181 NAF	.836 NAF	.936 NAF
JUN	.	.	-.923 NAF	-.910 NAF
JUL	-1.197	-1.602	-1.280	-1.409
MAGNESIUM (MG/L)		DET'M LIMIT = .050		GUIDELINE = 30 (F2)
JAN	5.000	5.000	4.800	5.000
FEB	4.700	5.100	5.100	5.100
MAR	5.900	5.900	5.800	5.900
APR	5.000	5.000	6.000	5.700
MAY	4.400	4.300	4.800	4.900
JUN	.	.	4.900	4.900
JUL	4.900	5.000	5.200	5.000
SODIUM (MG/L)		DET'M LIMIT = .200		GUIDELINE = 200 (C3)

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM SUMMARY (DAVID ST WTP) 1988

WATER TREATMENT PLANT

DISTRIBUTION SYSTEM

SITE 1		SITE 2		
STANDING	FREE FLOW	STANDING	FREE FLOW	
JAN	36.400	36.000	36.200	36.400
FEB	38.800	40.000	39.600	40.400
MAR	40.400	41.400	41.400	39.400
APR	32.800	33.200	41.600	40.000
MAY	29.200	29.600	33.000	32.600
JUN	.	.	32.800	33.600
JUL	28.800	32.400	32.400	31.800
AMMONIUM TOTAL (MG/L)		DET'M LIMIT = 0.002		GUIDELINE = .05 (F2)
JAN	.018	.018	.022	.014
FEB	.010	.006 <T	.016	.024
MAR	.018	.014	.028	.018
APR	.006 <T	.004 <T	.018	.016
MAY	.012	.016	.040	.014
JUN	.	.	.016	.138
JUL	.030	.008 <T	.016	.010
NITRITE (MG/L)		DET'M LIMIT = 0.001		GUIDELINE = 1.000 (A1)
JAN	.002 <T	.001 <T	.002 <T	.001 <T
FEB	.002 <T	.001 <T	.002 <T	.001 <T
MAR	.003 <T	.001 <T	.002 <T	.002 <T
APR	.002 <T	.001 <T	.002 <T	.002 <T
MAY	.002 <T	.002 <T	.003 <T	.002 <T
JUN	.	.	.002 <T	.002 <T
JUL	.001 <T	.002 <T	.002 <T	.002 <T
TOTAL NITRATES (MG/L)		DET'M LIMIT = .020		GUIDELINE = 10.000 (A1)
JAN	BOL	BOL	BOL	BOL
FEB	.075 <T	.055 <T	.050 <T	.055 <T
MAR	.105	.105	.095 <T	.095 <T
APR	.160	.160	.155	.135
MAY	.100	.095 <T	.095 <T	.085 <T
JUN	.	.	.110	.130
JUL	.160	.165	.205	.180
NITROGEN TOT KJELD (MG/L)		DET'M LIMIT = .020		GUIDELINE = N/A
JAN	.250	.220	.230	.220
FEB	.270	.220	.220	.490
MAR	.280	.210	.250	.230
APR	.220	.200	.280	.230
MAY	.220	.220	.310	.250
JUN	.	.	.220	.740
JUL	.230	.210	.100	.220
PH (DIMENSIONLESS)		DET'M LIMIT = N/A		GUIDELINE = 6.5-8.5(A4)
JAN	7.750	7.790	7.520	7.710

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM SUMMARY (DAVID ST WTP) 1988

WATER TREATMENT PLANT

DISTRIBUTION SYSTEM

	SITE 1		SITE 2		
	STANDING	FREE FLOW	STANDING	FREE FLOW	
FEB	7.650	7.690	7.600	7.490	
MAR	7.670	7.710	7.710	7.650	
APR	7.660	7.660	7.770	7.710	
MAY	7.660	7.630	7.840	7.790	
JUN	.	.	7.690	7.720	
JUL	7.510	7.220	7.470	7.430	
SULPHATE ()			DET'N LIMIT = .200		GUIDELINE = 500. (A3)
JUL	25.600	26.000	25.800	25.800	
TURBIDITY (FTU)			DET'N LIMIT = .02		GUIDELINE = 1.00 (A1)
JAN	1.830	.370	.900	.700	
FEB	5.500	.410	.850	.790	
MAR	6.900	.840	2.300	1.200	
APR	2.200	1.080	2.000	1.500	
MAY	1.020	.580	1.160	.740	
JUN	.	.	.890	.970	
JUL	1.700	.540	1.300	.950	

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM SUDBURY (DAVID ST WTP) 1988

WATER TREATMENT PLANT

DISTRIBUTION SYSTEM

SITE 1		SITE 2		
STANDING	FREE FLOW	STANDING	FREE FLOW	
METALS				
SILVER (UG/L)		DET'N LIMIT = .020		GUIDELINE = 50. (A1)
JAN	.040 <T	.030 <T	.030 <T	BDL
FEB	.070 <T	.040 <T	.030 <T	.100 <T
MAR	.080 <T	.040 <T	.030 <T	BDL
APR	.090 <T	.030 <T	.040 <T	.030 <T
MAY	BDL	BDL	.040 <T	BDL
JUN	.	.	BDL	BDL
JUL	.100 <T	.060 <T	.090 <T	BDL
ALUMINUM (UG/L)		DET'N LIMIT = .050		GUIDELINE = 100.(A4)
JAN	55.680	10.672	13.920	12.760
FEB	112.520	7.424	5.916	6.380
MAR	49.880	19.720	25.520	20.880
APR	38.280	37.120	33.640	31.320
MAY	33.640	17.400	22.040	16.240
JUN	.	.	6.380	9.164
JUL	29.000	6.960	7.772	8.004
ARSENIC (UG/L)		DET'N LIMIT = 0.050		GUIDELINE = 50.0 (A1)
JAN	1.700	1.400	1.100	1.400
FEB	2.400	1.100	1.000	1.000
MAR	.130 <T	BDL	BDL	BDL
APR	BDL	BDL	BDL	BDL
MAY	.660 <T	.620 <T	.750 <T	.650 <T
JUN	.	.	1.000 <T	1.400
JUL	.840 <T	.750 <T	.890 <T	.780 <T
BARIUM (UG/L)		DET'N LIMIT = 0.020		GUIDELINE = 1000. (A1)
JAN	18.000	17.000	18.000	16.000
FEB	27.000	17.000	21.000	22.000
MAR	22.000	20.000	19.000	22.000
APR	27.000	23.000	25.000	26.000
MAY	20.000	26.000	18.000	23.000
JUN	.	.	21.000	17.000
JUL	27.000	25.000	30.000	25.000
BORON (UG/L)		DET'N LIMIT = 0.200		GUIDELINE = 5000. (A1)
JAN	14.000 <T	14.000 <T	14.000 <T	14.000 <T
FEB	13.000 <T	13.000 <T	13.000 <T	14.000 <T
MAR	13.000 <T	13.000 <T	14.000 <T	14.000 <T
APR	11.000 <T	10.000 <T	12.000 <T	11.000 <T
MAY	14.000 <T	15.000 <T	11.000 <T	10.000 <T
JUN	.	.	16.000 <T	14.000 <T
JUL	15.000 <T	15.000 <T	14.000 <T	11.000 <T

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM SUDBURY (DAVID ST WTP) 1988

WATER TREATMENT PLANT

DISTRIBUTION SYSTEM

SITE 1		SITE 2		
STANDING	FREE FLOW	STANDING	FREE FLOW	
BERYLLIUM (UG/L)		DET'N LIMIT = 0.010		GUIDELINE = .20 (H)
JAN	.020 <T	.010 <T	BDL	.010 <T
FEB	.020 <T	BDL	.030 <T	.030 <T
MAR	.050 <T	.050 <T	.030 <T	.020 <T
APR	.020 <T	.020 <T	BDL	BDL
MAY	.060 <T	BDL	.040 <T	.030 <T
JUN	.	.	.050 <T	.020 <T
JUL	BDL	BDL	BDL	BDL
CADMIUM (UG/L)		DET'N LIMIT = 0.050		GUIDELINE = 5.000 (A1)
JAN	.250 <T	.120 <T	.120 <T	.090 <T
FEB	.790	.110 <T	.170 <T	.260 <T
MAR	.240 <T	.180 <T	.130 <T	.210 <T
APR	.430 <T	.270 <T	.350 <T	.380 <T
MAY	.220 <T	.180 <T	.120 <T	.170 <T
JUN	.	.	.290 <T	.140 <T
JUL	.400 <T	.320 <T	.530	.480 <T
COBALT (UG/L)		DET'N LIMIT = 0.020		GUIDELINE = 1000 (H)
JAN	1.300	.400 <T	.490 <T	.490 <T
FEB	8.900	.490 <T	43.000	2.700
MAR	2.600	.790 <T	.890	1.100
APR	1.000	.680 <T	.910	.680 <T
MAY	1.000 <T	.480 <T	.640 <T	.520 <T
JUN	.	.	31.000	1.400
JUL	1.400	.270 <T	.400 <T	.390 <T
CHROMIUM (UG/L)		DET'N LIMIT = 0.100		GUIDELINE = 50. (A1)
JAN	.230 <T	.120 <T	.320 <T	.240 <T
FEB	.490 <T	.100 <T	.100 <T	.110 <T
MAR	.360 <T	.270 <T	.380 <T	.560 <T
APR	.390 <T	.630 <T	.630 <T	.410 <T
MAY	.990 <T	.850 <T	.270 <T	.140 <T
JUN	.	.	.500 <T	.310 <T
JUL	BDL	BDL	BDL	BDL
COPPER (UG/L)		DET'N LIMIT = .100		GUIDELINE = 1000 (A3)
JAN	61.000	20.000	430.000	54.000
FEB	250.000	28.000	400.000	82.000
MAR	100.000	40.000	420.000	76.000
APR	790.000	68.000	750.000	150.000
MAY	210.000	35.000	310.000	58.000
JUN	.	.	680.000	88.000
JUL	260.000	100.000	850.000	230.000
IRON (UG/L)		DET'N LIMIT = 4.000		GUIDELINE = 300. (A3)

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM SUDBURY (DAVID ST WTP) 1988

WATER TREATMENT PLANT

DISTRIBUTION SYSTEM

SITE 1		SITE 2			
STANDING	FREE FLOW	STANDING	FREE FLOW		
JAN	150.000	28.000 <T	120.000	110.000	
FEB	600.000	44.000	120.000	130.000	
MAR	210.000	79.000	180.000	150.000	
APR	120.000	93.000	180.000	230.000	
MAY	80.000	50.000 <T	100.000	130.000	
JUN	.	.	160.000	170.000	
JUL	200.000	66.000	240.000	230.000	
MERCURY ()		DET'M LIMIT = 0.010		GUIDELINE = 1.000 (A1)	
JAN	.	.030	.	.020	
FEB	.	BDL	.	BDL	
MAR	.	BDL	.	.010	
APR	.	.010	.	.010	
MAY	.	BDL	.	BDL	
JUN	.	.	.	.020 <T	
JUL	.	.020 <T	.	.030 <T	
MANGANESE (UG/L)		DET'M LIMIT = .050		GUIDELINE = 50.0 (A3)	
JAN	120.000	27.000	39.000	44.000	
FEB	750.000	54.000	79.000	61.000	
MAR	200.000	72.000	67.000	90.000	
APR	71.000	47.000	73.000	64.000	
MAY	50.000	21.000	33.000	27.000	
JUN	.	.	35.000	23.000	
JUL	120.000	22.000	45.000	38.000	
MOLYBDENUM (UG/L)		DET'M LIMIT = 0.020		GUIDELINE = 500 (H)	
JAN	.200 <T	.230 <T	.280 <T	.190 <T	
FEB	.160 <T	.210 <T	.190 <T	.150 <T	
MAR	.190 <T	.180 <T	.140 <T	.140 <T	
APR	.160 <T	.220 <T	.170 <T	.140 <T	
MAY	.150 <T	.170 <T	.230 <T	.210 <T	
JUN	.	.	.220 <T	.250 <T	
JUL	.150 <T	.140 <T	.100 <T	.130 <T	
NICKEL (UG/L)		DET'M LIMIT = 0.100		GUIDELINE = 50. (F3)	
JAN	120.000	87.000	71.000	92.000	
FEB	260.000	92.000	120.000	150.000	
MAR	150.000	120.000	87.000	160.000	
APR	170.000	140.000	160.000	190.000	
MAY	79.000	140.000	64.000	160.000	
JUN	.	.	110.000	85.000	
JUL	160.000	150.000	200.000	180.000	
LEAD (UG/L)		DET'M LIMIT = 0.050		GUIDELINE = 50. (A1)	
JAN	6.900	1.300	13.000	.880	

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM SUMMARY (DAVID ST WTP) 1988

WATER TREATMENT PLANT

DISTRIBUTION SYSTEM

	SITE 1		SITE 2		
	STANDING	FREE FLOW	STANDING	FREE FLOW	
FEB	6.000	.820	5.300	1.800	
MAR	6.100	1.300	10.000	.980	
APR	78.000	1.600	11.000	1.400	
MAY	28.000	1.300	8.400	1.100	
JUN	.	.	43.000	3.700	
JUL	12.000	2.600	16.000	1.800	
ANTIMONY (UG/L)		DET'M LIMIT = .050		GUIDELINE = 146. (D4)	
JAN	.130 <T	.120 <T	.150 <T	.110 <T	
FEB	.130 <T	.130 <T	.160 <T	.180 <T	
MAR	.150 <T	.140 <T	.170 <T	.120 <T	
APR	.160 <T	.120 <T	.150 <T	.130 <T	
MAY	.080 <T	.100 <T	.180 <T	.120 <T	
JUN	.	.	.250	.100 <T	
JUL	.210	.140 <T	.230	.150 <T	
SELENIUM (UG/L)		DET'M LIMIT = 0.200		GUIDELINE = 10. (A1)	
JAN	1.200 <T	1.300 <T	1.900 <T	1.900 <T	
FEB	1.300 <T	1.200 <T	1.600 <T	.990 <T	
MAR	2.000 <T	2.300 <T	2.100 <T	1.700 <T	
APR	.830 <T	1.000 <T	1.300 <T	.970 <T	
MAY	.720 <T	1.600 <T	1.700 <T	1.300 <T	
JUN	.	.	2.500 <T	1.700 <T	
JUL	BDL	1.600 <T	1.300 <T	BDL	
STRONTIUM (UG/L)		DET'M LIMIT = .050		GUIDELINE = 2000. (N)	
JAN	62.000	63.000	66.000	63.000	
FEB	58.000	58.000	59.000	60.000	
MAR	61.000	62.000	65.000	63.000	
APR	67.000	58.000	71.000	64.000	
MAY	48.000	51.000	58.000	58.000	
JUN	.	.	56.000	53.000	
JUL	51.000	49.000	53.000	54.000	
TITANIUM (UG/L)		DET'M LIMIT = .050		GUIDELINE = N/A	
JAN	6.800	3.600	3.600	3.900	
FEB	11.000	3.300	13.000	3.600	
MAR	7.400	4.800	4.900	5.200	
APR	5.000	6.000	4.700	4.200	
MAY	3.900	3.000	3.000	2.900	
JUN	.	.	10.000	3.200	
JUL	4.100	3.000	3.400	3.200	
THALLIUM (UG/L)		DET'M LIMIT = .010		GUIDELINE = 13. (D4)	
JAN	.010 <T	BDL	BDL	BDL	

TABLE 3

DRINKING WATER SURVEILLANCE PROGRAM BLENHEIM (DAVID ST WTP) 1988

WATER TREATMENT PLANT

DISTRIBUTION SYSTEM

SITE 1		SITE 2		
STANDING	FREE FLOW	STANDING	FREE FLOW	
FEB	.100 <T	.020 <T	.020 <T	.020 <T
MAR	.030 <T	.010 <T	.010 <T	.020 <T
APR	NOL	NOL	.020 <T	NOL
MAY	NOL	.020 <T	.020 <T	NOL
JUN	.	.	NOL	NOL
JUL	.020 <T	NOL	NOL	NOL
URANIUM (UG/L)		DET'M LIMIT = .020		GUIDELINE = 20. (A2)
JAN	.070 <T	.050 <T	.060 <T	.060 <T
FEB	.090 <T	.040 <T	.020 <T	.040 <T
MAR	.130 <T	.090 <T	.060 <T	.050 <T
APR	.050 <T	.060 <T	.040 <T	.050 <T
MAY	.050 <T	.030 <T	.080 <T	.040 <T
JUN	.	.	.040 <T	.050 <T
JUL	.060 <T	.040 <T	.030 <T	.030 <T
VANADIUM (UG/L)		DET'M LIMIT = .050		GUIDELINE = 100 (N)
JAN	.350 <T	.270 <T	.230 <T	.220 <T
FEB	.370 <T	.080 <T	.090 <T	.080 <T
MAR	.140 <T	NOL	NOL	NOL
APR	NOL	NOL	NOL	NOL
MAY	.060 <T	.020 <T	.020 <T	NOL
JUN	.	.	.020 <T	.060 <T
JUL	.260 <T	.220 <T	.170 <T	.140 <T
ZINC (UG/L)		DET'M LIMIT = .001		GUIDELINE = 5000. (A3)
JAN	39.000	5.800	61.000	8.500
FEB	39.000	5.700	34.000	22.000
MAR	29.000	9.400	42.000	11.000
APR	220.000	17.000	66.000	25.000
MAY	89.000	14.000	53.000	9.900
JUN	.	.	220.000	19.000
JUL	72.000	21.000	110.000	29.000

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM SUMMARY (DAVID ST WTP) 1988

WATER TREATMENT PLANT

DISTRIBUTION SYSTEM

SITE 1		SITE 2	
STANDING	FREE FLOW	STANDING	FREE FLOW
PESTICIDES & PCB			
ALPHA BHC ()		DET'N LIMIT = 1.000	GUIDELINE = 700 (G)
JAN	1.000 <T	1.000 <T	
FEB	2.000 <T	2.000 <T	
MAR	2.000 <T	1.000 <T	
APR	NOL	NOL	
MAY	NOL	NOL	
JUN	-	NOL	
JUL	NOL	NOL	
LINDANE ()			
		DET'N LIMIT = 1.000	GUIDELINE = 4000 (A1)
JAN	NOL	NOL	
FEB	NOL	NOL	
MAR	1.000 <T	1.000 <T	
APR	NOL	NOL	
MAY	NOL	NOL	
JUN	-	NOL	
JUL	NOL	NOL	

TABLE 3

DRINKING WATER SURVEILLANCE PROGRAM SUMMARY (DAVID ST W/P) 1988

WATER TREATMENT PLANT

DISTRIBUTION SYSTEM

SITE 1		SITE 2		
STANDING	FREE FLOW	STANDING	FREE FLOW	
VOLATILES				
TOLUENE ()		DET'N LIMIT = .050		GUIDELINE = 24.0 (B4)
MAR	•	NDL	•	NDL
APR	•	NDL	•	NDL
MAY	•	NDL	•	.050 UCS
JUN	•	•	•	.050 <T
JUL	•	.050 <T	•	.050 <T
ETHYLBENZENE ()		DET'N LIMIT = .050		GUIDELINE = 2.4 (B4)
MAR	•	ITX	•	ITX
APR	•	NDL	•	NDL
MAY	•	.100 <T	•	NDL
JUN	•	•	•	.150 <T
JUL	•	.050 <T	•	.050 <T
CHLOROFORM ()		DET'N LIMIT = .100		GUIDELINE = 350 (A1+)
MAR	•	ITX	•	ITX
APR	•	35.300	•	32.400
MAY	•	33.100	•	33.000
JUN	•	•	•	31.700
JUL	•	38.500	•	33.900
DICHLOROBROMOMETHANE ()		DET'N LIMIT = .050		GUIDELINE = 350 (A1+)
MAR	•	ITX	•	ITX
APR	•	6.100	•	7.500
MAY	•	7.800	•	7.750
JUN	•	•	•	7.150
JUL	•	8.700	•	6.550
CHLOROISOBROMOMETHANE ()		DET'N LIMIT = .100		GUIDELINE = 350 (A1+)
MAR	•	ITX	•	ITX
APR	•	.600 <T	•	.600 <T
MAY	•	.800 <T	•	.800 <T
JUN	•	•	•	1.100
JUL	•	.900 <T	•	.800 <T
TOTL TRIHALOMETHANES ()		DET'N LIMIT = .500		GUIDELINE = 350 (A1)
MAR	•	ITX	•	ITX
APR	•	42.000	•	40.500
MAY	•	41.700	•	41.500
JUN	•	•	•	39.950
JUL	•	48.100	•	41.250

Table VI

<u>SCAN/PARAMETER</u>	<u>UNIT</u>	<u>DETECTION LIMIT</u>	<u>GUIDELINE</u>
BACTERIOLOGICAL			
STANDARD PLATE COUNT MEMBRANE FILTRATION	CT/ML	0	500/ML (A1)
P/A BOTTLE		0	0 (A1*)
TOTAL COLIFORM MEMBRANE FILTRATION	CT/100ML	0	5/100ML (A1)
TOTAL COLIFORM BACKGROUND NF	CT/100ML	0	N/A
CHLOROAROMATICS			
HEXACHLOROCYCLODIENE	NG/L	1.000	450. (D4)
1,2,3-TRICHLOROBENZENE	NG/L	5.000	10000 (I)
1,2,3,4-TETRACHLOROBENZENE	NG/L	1.000	10000 (I)
1,2,3,5-TETRACHLOROBENZENE	NG/L	1.000	10000 (I)
1,2,4-TRICHLOROBENZENE	NG/L	5.000	10000 (I)
1,2,4,5-TETRACHLOROBENZENE	NG/L	1.000	38000 (D4)
1,3,5-TRICHLOROBENZENE	NG/L	5.000	10000 (D4)
HEXACHLOROBENZENE	NG/L	1.0	10. (C1)
HEXACHLOROETHANE	NG/L	1.000	1900. (D4)
OCTACHLOROSTYRENE	NG/L	1.000	N/A
PENTACHLOROBENZENE	NG/L	1.000	74000 (D4)
2,3,6-TRICHLOROTOLUENE	NG/L	5.000	N/A
2,4,5-TRICHLOROTOLUENE	NG/L	5.000	N/A
2,6,4-TRICHLOROTOLUENE	NG/L	5.000	N/A
CHLOROPHENOLS			
2,3,4-TRICHLOROPHENOL	NG/L	50.	N/A
2,3,4,5-TETRACHLOROPHENOL	NG/L	50.	N/A
2,3,5,6-TETRACHLOROPHENOL	NG/L	50.	N/A
2,4,5-TRICHLOROPHENOL	NG/L	50.	260000 (D4)
2,4,6-TRICHLOROPHENOL	NG/L	50.	5000. (B1)
PENTACHLOROPHENOL	NG/L	50.	60000. (B1)
CHEMISTRY (FLD)			
FIELD COMBINED CHLORINE RESIDUAL	MG/L	N/A	N/A
FIELD FREE CHLORINE RESIDUAL	MG/L	N/A	N/A
FIELD TOTAL CHLORINE RESIDUAL	MG/L	N/A	N/A
FIELD PH	DMSNLESS	N/A	6.5-8.5 (A4)
FIELD TEMPERATURE	°C	N/A	<15 °C (A1)
FIELD TURBIDITY	FTU	N/A	1.0 (A1)
CHEMISTRY (LAB)			
ALKALINITY	MG/L	.200	30-500 (A4)
CALCIUM	MG/L	.100	100. (F2)
CYANIDE	MG/L	.001	.20 (A1)
CHLORIDE	MG/L	.200	250. (A3)
COLOUR	TCU	.5	5.0 (A3)
CONDUCTIVITY	UMHO/CM	1.	400. (F2)
FLUORIDE	MG/L	.01	2.4 (A1)
HARDNESS	MG/L	.50	80-100 (A4)
MAGNESIUM	MG/L	.05	30. (F2)
SODIUM	MG/L	.20	200. (C3)
AMMONIUM TOTAL	MG/L	.002	.05 (F2)
NITRITE	MG/L	.001	1.0 (A1)
TOTAL NITRATES	MG/L	.02	10. (A1)
NITROGEN TOTAL KJELDAHL	MG/L	.02	N/A
PH	DMSNLESS	N/A	6.5-8.5 (A4)
PHOSPHORUS FIL REACT	MG/L	.0005	N/A
PHOSPHORUS TOTAL	MG/L	.002	.40 (F2)
TOTAL SOLIDS	MG/L	1.	500. (A3)
TURBIDITY	FTU	.02	1.0 (A1)

METALS

BORON	UG/L	.200	5000.	(A1)
DETECTION				
SCAN/PARAMETER	UNIT	LIMIT	GUIDELINE	
BERYLLIUM	UG/L	.010	0.20	(H)
CADMIUM	UG/L	.050	5.0	(A1)
COBALT	UG/L	.020	1000.	(H)
CHROMIUM	UG/L	.100	50.	(A1)
COPPER	UG/L	.100	1000.	(A3)
IRON	UG/L	4.0	300.	(A3)
MERCURY	UG/L	.01	1.0	(A1)
MANGANESE	UG/L	.050	50.	(A3)
MOLYBDENUM	UG/L	.020	500.	(H)
NICKEL	UG/L	.100	50.	(F3)
LEAD	UG/L	.050	50.	(A1)
SELENIUM	UG/L	.200	10.	(A1)
SILVER	UG/L	.020	50.	(A1)
STRONTIUM	UG/L	.050	2000.	(H)
THALLIUM	UG/L	.010	13.	(D4)
TITANIUM	UG/L	.050	N/A	
URANIUM	UG/L	.020	20.	(A2)
VANADIUM	UG/L	.050	100.	(H)
ZINC	UG/L	.020	500.	(A3)

PHENOLICS

PHENOLICS (UNFILTERED REACTIVE)	UG/L	.2	2.0	(A3)
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PESTICIDES & PCB

ALDRIN	NG/L	1.0	700.	(A1)
AMETRINE	NG/L	50.	300000.	(D3)
ATRAZINE	NG/L	50.	60000.	(B3)
ALPHA HEXACHLOROCYCLOHEXANE (BHC)	NG/L	1.0	700.	(G)
BETA HEXACHLOROCYCLOHEXANE (BHC)	NG/L	1.0	300.	(G)
GAMMA HEXACHLOROCYCLOHEXANE (LINDANE)	NG/L	1.0	4000.	(A1)
ALPHA CHLORDANE	NG/L	2.0	7000.	(A1)
GAMMA CHLORDANE	NG/L	2.0	7000.	(A1)
BLADIX	NG/L	100.	10000.	(B3)
DIELDRIN	NG/L	2.0	700.	(A1)
METHOXYCHLOR	NG/L	5.0	100000.	(A1)
ENDOSULFAN 1 (THIODAN I)	NG/L	2.0	74000.	(D4)
ENDOSULFAN 2 (THIODAN II)	NG/L	4.0	74000.	(D4)
ENDRIN	NG/L	4.0	200.	(A1)
ENDOSULFAN SULPHATE (THIODAN SULPHATE)	NG/L	4.0	N/A	
HEPTACHLOR EPOXIDE	NG/L	1.0	3000.	(A1)
HEPTACHLOR	NG/L	1.0	3000.	(A1)
METOLACHLOR	NG/L	500.	50000.	(B3)
MIREX	NG/L	5.0	N/A	
OXYCHLORDANE	NG/L	2.0	N/A	
O,P-DDT	NG/L	5.0	30000.	(A1)
PCB	NG/L	20.0	3000.	(A2)
O,P-DDD	NG/L	5.0	N/A	
PPDE	NG/L	1.0	30000.	(A1)
PPDDT	NG/L	5.0	30000.	(A1)
ATRAZONE	NG/L	50.	N/A	
ALACHLOR	NG/L	500.	35000.	(D2)
PROMETONE	NG/L	50.	52500.	(D3)
PROPACINE	NG/L	50.	16000.	(D2)
PROMETRYNE	NG/L	50.	1000.	(B3)
SENCOR (METRIBUZIN)	NG/L	100.	80000.	(B2)
SIMAZINE	NG/L	50.	10000.	(B3)

POLYAROMATIC HYDROCARBONS

PHENANTHRENE	NG/L	10.0	N/A	
ANTHACENE	NG/L	1.0	N/A	
FLUORANTHENE	NG/L	20.0	42000.	(D4)
PYRENE	NG/L	20.0	N/A	
BENZO(A)ANTHRACENE	NG/L	20.0	N/A	
CHRYSENE	NG/L	50.0	N/A	
DIMETHYL BENZO(A)ANTHRACENE	NG/L	5.0	N/A	
BENZO(E)PYRENE	NG/L	50.0	N/A	
BENZO(B)FLUORANTHENE	NG/L	10.0	N/A	
PERYLENE	NG/L	10.0	N/A	
BENZO(K)FLUORANTHENE	NG/L	1.0	N/A	
BENZO(A)PYRENE	NG/L	5.0	10.	(B1)

BENZO(G,H,I)PERYLENE	NG/L	20.0	N/A
		DETECTION	
<u>SCAN/PARAMETER</u>	<u>LIMIT</u>	<u>LIMIT</u>	<u>GUIDELINE</u>
DIBENZO(A,H)ANTHRACENE	NG/L	10.0	N/A
INDENO(1,2,3-C,D)PYRENE	NG/L	20.0	N/A
BENZO(B)CHRYSENE	NG/L	2.0	N/A
CORONENE	NG/L	10.0	N/A

SPECIFIC PESTICIDES

TOKAPHENE	NG/L	N/A	5000. (A1)
2,4,5-TRICHLOROBUTYRIC ACID (2,4,5-T)	NG/L	50.	280000. (B1)
2,4-DICHLOROBUTYRIC ACID (2,4-D)	NG/L	100.	100000. (A1)
2,4-DICHLOROPHENOXYBUTYRIC ACID	NG/L	200.	18000. (B3)
2,4-D PROPIONIC ACID	NG/L	100.	N/A
DICAMBA	NG/L	100.	87000. (B3)
PICHLORAM	NG/L	100.	2450000. (D3)
SILVEX (2,4,5-TP)	NG/L	50.	10000. (A1)
DIAZINON	NG/L	20.	14000. (A1)
DICHLOROVOS	NG/L	20.	N/A
DURSBAN	NG/L	20.	N/A
ETHION	NG/L	20.	35000. (G)
GUTHION	NG/L	N/A	N/A
MALATHION	NG/L	20.	160000. (G)
NEVINPHOS	NG/L	20.	N/A
METHYL PARATHION	NG/L	50.	7000. (B3)
METHYLTRITHION	NG/L	20.	N/A
PARATHION	NG/L	20.	35000. (B1)
PHORATE (THINET)	NG/L	20.	35. (D2)
RELDAN	NG/L	20.	N/A
RONNEL	NG/L	20.	N/A
AMINOCARB	NG/L	N/A	N/A
BENOMYL	NG/L	N/A	N/A
BLX (METALKAMATE)	NG/L	2000.	N/A
CARBOFURAN	NG/L	2000.	18000. (D3)
CICP (CHLOROPROPAH)	NG/L	2000.	350000. (G)
DIALATE	NG/L	2000.	30000. (H)
EPTAN	NG/L	2000.	N/A
IPC	NG/L	2000.	N/A
PROPOXUR (BAYGON)	NG/L	2000.	90000. (G)
SEVIN (CARBARYL)	NG/L	200.	70000. (A1)
SUTAN (BUTYLATE)	NG/L	2000.	245000. (D3)

VOLATILES

BENZENE	UG/L	.050	5.0 (B1)
TOLUENE	UG/L	.050	24.0 (B4)
ETHYLBENZENE	UG/L	.050	2.4 (B4)
PARA-XYLENE	UG/L	.100	300. (B4)
META-XYLENE	UG/L	.100	300. (B4)
ORTHO-XYLENE	UG/L	.050	300. (B4)
1,1-DICHLOROETHYLENE	UG/L	.100	7.0 (D1)
ETHYLENE DIBROMIDE	UG/L	.05	50. (G)
METHYLENE CHLORIDE	UG/L	.500	1750. (D3)
TRANS-1,2-DICHLOROETHYLENE	UG/L	.100	350. (D3)
1,1-DICHLOROETHANE	UG/L	.100	N/A
CHLOROFORM	UG/L	.100	350. (A1+)
1,1,1-TRICHLOROETHANE	UG/L	.020	200. (D1)
1,2-DICHLOROETHANE	UG/L	.050	5.0 (D1)
CARBON TETRACHLORIDE	UG/L	.200	5.0 (D1)
1,2-DICHLOROPROPANE	UG/L	.050	10.0 (G)
TRICHLOROETHYLENE	UG/L	.100	5.0 (D1)
DICHLOROBROMOMETHANE	UG/L	.050	350. (A1+)
1,1,2-TRICHLOROETHANE	UG/L	.050	60(D4)
CHLORODIBROMOMETHANE	UG/L	.100	350. (A1+)
TETRACHLOROETHYLENE	UG/L	.050	10.0 (C2)
BROMOFORM	UG/L	.200	350. (A1+)
1,1,2,2-TETRACHLOROETHANE	UG/L	.050	0.17(D4)
CHLOROBENZENE	UG/L	.100	1510. (D3)
1,4-DICHLOROBENZENE	UG/L	.100	5.0 (B1)
1,3-DICHLOROBENZENE	UG/L	.100	130. (G)
1,2-DICHLOROBENZENE	UG/L	.050	200. (B1)
TRIFLUOROCHLOROTOLUENE	UG/L	.100	N/A
TOTAL TRICHALOMETHANES	UG/L	.500	350. (A*)
STYRENE	UG/L	.05	46.5 (D2)